204.10 - Optical Properties-Notes

SRM 930e: This SRM is for the verification of the transmittance and absorbance scales of visible absorption spectrometers. It differs from the prior series, SRM 930d, only with respect to tightened optical polishing tolerances. SRM 930e has been polished to a parallelism of 20 arc seconds or better, to reduce the optical deviation (relative to SRM 930d) and improve performance in instruments where wavelength dispersion occurs after the light has passed through the filter. SRM 930e consists of three individual Schott NG-type glass filters in separate metal cuvette-style holders and an empty filter holder. The nominal percent transmittances of the three filters are 10%, 20%, and 30%. The three filters are individually certified for transmittance at five wavelengths in the visible spectrum: 440.0 nm, 465.0 nm, 546.1 nm, 590.0 nm, and 635.0 nm. The optical transmittance neutrality of SRM 930e is sufficient for the filters to be used to accurately verify absorption spectrometers with maximum spectral bandpasses ranging from 2.2 nm to 6.5 nm for the five wavelengths at which the transmittances are certified. When SRM 930e is used in combination with SRM 1930, a 6-point stepwise verification of the transmittance scale is possible over the transmittance range from 1% to 50%. A detailed discussion of this SRM and SRM 1930 is given in Special Publication 260-116. (See NOTE.)

SRM 931g: This SRM is for the verification of the absorbance scales of ultraviolet and visible absorption spectrometers having narrow spectral bandpasses. SRM 931g consists of three sets of four solutions in sealed 10 mL ampoules. The four solutions include a blank solution and three concentrations of an empirical inorganic solution prepared from high purity cobalt and nickel metals dissolved in a mixture of nitric and perchloric acids. The user must transfer the blank and standard solutions to cuvettes of known pathlength. The spectrum has absorption maxima at 302 nm, 395 nm, and 512 nm, and a plateau in the region of 678 nm at which the absorbances are certified. The nominal absorbances of the three empirical inorganic solution standards are 0.3, 0.6, and 0.9, respectively, at wavelengths 302 nm, 395 nm, and 512 nm. At wavelength 678 nm, the nominal absorbances of the three solutions are 0.1, 0.2, and 0.3, respectively. The liquid filters may be used to verify absorption spectrometers with maximum spectral bandpasses ranging from 1.5 nm to 8.5 nm for the four wavelengths at which the absorbances are certified.

SRM 935a: This SRM is for the verification of the absorbance scales of ultraviolet absorption spectrometers having spectral bandpasses not exceeding 2 nm. Issued in 15 g units, SRM 935a consists of crystalline potassium dichromate of established purity. Solutions of ten known concentrations of this SRM in 0.001 N perchloric acid (between 20 mg/kg and 200 mg/kg) are certified for their specific absorbances under well-defined conditions. The user must prepare the liquid solutions from SRM 935a and then transfer them to cuvettes of known pathlength. The certified specific absorbances for the solutions prepared may be converted to their corresponding reference absorbance values using Beer's Law. Acidic SRM 935a solutions may be prepared anywhere within the concentra tion range of 20 mg/kg to 200 mg/kg to provide a standard with the desired absorbance at a specified wavelength. The spectrum has absorption maxima at 257 nm and 350 nm, and absorption minima at 235 nm and 313 nm at which the specific absorbance values are certified. A detailed discussion of this SRM is given in Special Publication 260-54.

SRM 1921b: This SRM is for use in the calibration of the wavelength scale of spectrometers in the infrared (IR) spectral region from 3.2 mm to 18 mm (555 cm-1 to 3125 cm-1). SRM 1921a consists of three cards made of a matte finish polystyrene film, approximately 38 mm thick with a 25-mm diameter clear aperture and centered 38 mm from the bottom of a cardboard holder 5 cm ′ 11 cm ′ 2 mm in size. The certified wavelength values, corresponding peak wavenumber values for thirteen absorption peak positions in the 3 mm to 18 mm range, and a spectrum marked with arrows identifying the certified peaks, are provided with each unit. A detailed discussion of this SRM is given in Special Publication 260-122.

SRM 2031a: This SRM is for the verification of the transmittance and absorbance scales of ultraviolet and visible absorption spectrometers. SRM 2031a consists of three individual non-fluorescent, fused silica filters in separate metal cuvette-style holders and an empty filter holder. The nominal transmittances of the three filters are 10%, 30%, and 90%. The quartz base plates of the 10% and 30% filters carry different thicknesses of semi-transparent chromium metal that are optically contacted to quartz cover plates. The nominal 90% filter is a single clear quartz plate. The three filters are individually certified for transmittances at ten wavelengths in the ultraviolet and visible spectral regions: 250.0 nm, 280.0 nm, 340 nm, 360.0 nm, 400.0 nm, 465.0 nm, 500.0 nm, 546.1 nm, 590.0 nm, and 635.0 nm. The optical transmittance neutrality of SRM 2031a is such that wider spectral bandpasses can be used. Consequently, it is the only transmittance SRM that is suitable for use with these absorption

SRM	Description	Unit Size